

What is claimed is:

1. A DNA molecule comprising an isolated DNA sequence encoding a V1-1 related protein.
2. A DNA molecule according to claim 1, wherein said DNA sequence is selected from the group consisting of:
 - (a) nucleotides #571 or #577 to #882 of SEQ ID NO:1; and
 - (b) sequences which hybridize to (a) under stringent hybridization conditions and encode a V1-1 related protein which exhibits the ability to form tendon/ligament-like tissue.
3. A DNA molecule comprising the DNA sequence of claim 1 wherein said DNA sequence is selected from the group consisting of:
 - (a) nucleotides encoding for amino acids #1 or #3 to #104 of SEQ ID NO:2;
 - (b) in a 5' to 3' direction, nucleotides encoding a propeptide selected from the group consisting of native V1-1 propeptide and a BMP protein propeptide; and nucleotides encoding for amino acids #1 to #3 to #104 of SEQ ID NO:2; and
 - (c) sequences which hybridize to (a) or (b) under stringent hybridization conditions and encode a V1-1 related protein which exhibits the ability to form cartilage and/or bone.
4. A host cell transformed with a DNA molecule according to claim 1.
5. A host cell transformed with the DNA molecule of claim 2.
6. A host cell transformed with the DNA molecule of claim 3.
7. An isolated DNA molecule having a sequence encoding a V1-1 protein which is characterized by the ability to induce the formation of tendon/ligament-like tissue, said DNA molecule comprising a DNA sequence selected from the group consisting of:
 - (a) nucleotide #571 or #577 to #882 of SEQ ID NO:1; and
 - (b) naturally occurring allelic sequences and equivalent degenerative codon sequences of (a).
8. A host cell transformed with the DNA molecule of claim 7.
9. A vector comprising a DNA molecule of claim 7 in operative association with an expression control sequence therefor.
10. A host cell transformed with the vector of claim 9.

11. A method for producing a purified V1-1 protein, said method comprising the steps of:

(a) culturing a host cell transformed with a DNA molecule according to claim 2, comprising a nucleotide sequence encoding a V1-1 related protein; and

(b) recovering and purifying said V1-1 related protein from the culture medium.

12. A method for producing a purified V1-1 related protein said method comprising the steps of:

(a) culturing a host cell transformed with a DNA molecule according to claim 3, comprising a nucleotide sequence encoding a V1-1 related protein; and

(b) recovering and purifying said V1-1 related protein from the culture medium.

13. A method for producing a purified V1-1 related protein said method comprising the steps of:

(a) culturing a host cell transformed with a DNA molecule according to claim 7, comprising a nucleotide sequence encoding a V1-1 related protein; and

(b) recovering and purifying said V1-1 related protein from the culture medium.

14. A purified polypeptide comprising an amino acid sequence selected from the following group:

(a) from amino acid #1 to amino acid #104 as set forth in SEQ ID NO:2; and

(b) from amino acid #3 to amino acid #104 as set forth in SEQ ID NO:2.

15. A purified polypeptide wherein said polypeptide is in the form of a dimer comprised of two subunits, each with the amino acid sequence of claim 14.

16. A purified protein produced by the steps of

(a) culturing a cell transformed with a DNA molecule comprising the nucleotide sequence from nucleotide #571 or #577 to #882 as shown in SEQ ID NO:1; and

(b) recovering and purifying from said culture medium a protein

comprising the amino acid sequence from amino acid #1 or amino acid #3 to amino acid #104 as shown in SEQ ID NO:2.

17. A purified V1-1 related protein characterized by the ability to induce the formation of tendon/ligament-like tissue.

18. A pharmaceutical composition comprising an effective amount of the V1-1 related protein of claim 17 in admixture with a pharmaceutically acceptable vehicle.

19. A method for inducing tendon/ligament-like tissue formation in a patient in need of same comprising administering to said patient an effective amount of the composition of claim 18.

20. A pharmaceutical composition for tendon/ligament-like tissue healing and tissue repair said composition comprising an effective amount of the protein of a V1-1 related protein in a pharmaceutically acceptable vehicle.

21. A method for treating tendinitis, or other tendon or ligament defect in a patient in need of same, said method comprising administering to said patient an effective amount of the composition of claim 20.

22. A chimeric DNA molecule comprising a DNA sequence encoding a propeptide from a member of the TGF- β superfamily of proteins linked in correct reading frame to a DNA sequence encoding a V1-1 related polypeptide.

23. A chimeric DNA molecule according to claim 22, wherein the propeptide is the propeptide from BMP-2.

24. A heterodimeric protein molecule comprising one monomer having the amino acid sequence of the polypeptide of claim 14, and one monomer having the amino acid sequence of a protein of the TGF- β superfamily.

25. A method for inducing tendon/ligament-like tissue formation in a patient in need of same comprising administering to said patient an effective amount of a composition comprising a protein encoded by a DNA sequence selected from the group consisting of:

- (a) nucleotides #571 or #577 to #882 of SEQ ID NO:1;
- (b) nucleotides #845 or #899 to #1204 of SEQ ID NO:3; and

(c) sequences which hybridize to (a) or (b) under stringent hybridization conditions and encode a protein which exhibits the ability to form tendon/ligament-like tissue.

26. A method for inducing tendon/ligament-like tissue formation in a patient in need of same comprising administering to said patient an effective amount of the composition comprising a tendon/ligament-like tissue inducing protein having an amino acid sequence selected from the group consisting of:

- (a) amino acids #1 or #3 to #104 of SEQ ID NO:2;
- (b) amino acids #1 or #19 to #120 of SEQ ID NO:4;
- (c) mutants and/or variants of (a) or (b) which exhibit the ability to form tendon and/or ligament.

27. A pharmaceutical composition for tendon/ligament-like tissue repair, said composition comprising an effective amount of a V1-1 related protein in a pharmaceutically acceptable vehicle.

28. A method for treating tendinitis, or other tendon or ligament defect in a patient in need of same, said method comprising administering to said patient an effective amount of the composition of claim 27.